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Editorial Comment

This Issue This issue of *Diseases of the Chest* should prove very interesting because of the importance of the tuberculosis problem as it affects our armed forces.

One of the primary objects of the American College of Chest Physicians is "Maintaining the highest standards of the chest specialist in his relationship to the public welfare." In June, 1940, the president of the College appointed a Military Affairs Committee which completed certain surveys and offered a Suggested Plan for the Accomplishment of Efficient and Rapid Chest X-ray Examinations. We are pleased to publish the report of this committee as presented at the meeting of the College at Cleveland, Ohio, June 2, 1941.

At the outset of the emergency, the medical departments of the Army and the Navy adopted in principle the idea of completing an x-ray examination of each selectee, and took into consideration types of x-ray equipment and procedure other than the standard 14x17 cellulose film.

We are presenting a series of observations by some of the men who had a part in x-raying the selectees. Their observations on the relative value of the different x-ray procedures as evaluated by their experience is very interesting. These results, combined

with results of the military authorities, as the work progresses, will no doubt go a long way in the determination of the precise x-ray procedure to be eventually adopted at all induction centers.

We take this opportunity to emphasize the human error factor in the diagnosis of early pulmonary tuberculosis even by the most experienced, when the diagnosticians are compelled to work under pressure of a limited time element. Edwards and Ehrlich pointed out an error of 12.9 per cent in their series of examinations in New York City. By a further study of some 318 men disqualified at induction centers they found 49 that were physically qualified for military service. The number of individuals salvaged by them is not inconsiderable. What seems more important, however, is the grave injustice done the individual when he is mistakenly labeled as tuberculous. We are sure it is the hope of all concerned that a further study of disqualified men will be made possible.

We believe that if and when the suggested changes are made in section 13 M.R. 1-9 as recommended by the sub-committee on Tuberculosis of the National Research Council, the whole procedure of x-ray and diagnosis of chest conditions will be implemented in a most satisfactory manner.

C. M. H.

Presidential Address*

War and Tuberculosis

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\$1,185,914,489.56 is the approximate expenditure of the Veterans Administration of these United States for service connected tuberculosis for World War Number 1 through the year of 1940. I say "approximate" because in addition to these figures, if all expenditures were available in their entirety, they would indicate that many more millions of dollars had been utilized in the Army and in the Naval branch of the armed services, before members of those services having tuberculosis were invalided to the Veterans Administration.

These are dollars, but back of them are human beings; human beings to the number of 293,761 classed as World War tuberculosis admissions, from the years of 1921 to 1940 inclusive. Perhaps a better idea may be had from the figure 1,085,245—representing the sum total of tuberculous patients' years on the rolls for supervision, compensation and

pensions in the Veterans Administration for the years 1919 to 1940 inclusive. And, I should also like to bring to your attention the number 442,102—representing the total number of tuberculosis cases treated, and classed as patients' years of hospitalization for 1921 to 1940 inclusive (See Tables I, II, III).

What are our interests as individuals and as an organization in these statistics? A national emergency again exists. That emergency is again War and with war there has always been an increase in tuberculosis. Will that increase occur this time? What are the factors that can cause an increase? What measures are being and should be taken to prevent their occurrence? This organization, the American College of Chest Physicians, has as one of its first tenets the eradication of tuberculosis and, therefore, these questions should interest every Fellow in this organization.

Epidemiologists have been divided for many years on the important basic causes that affect the morbidity and mortality rates of this disease. Two schools of thought have promulgated their ideas.

1) One is the school of genetics whose prime idea is that there is a health heredity. This health heredity results from individuals having run the gamut of disease through generations and centuries and, finally, evidencing an improved physical stamina—the law of "survival of the fittest."

2) The other group consists of those who insist that variations in morbidity and mortality are the result of the problem of infection; infection with its varying intimacies of exposure causing the variances of disease incidence; infection as it is affected by the constitutional reactions and resistance of individuals, and which latter very frequently determine the seriousness of the disease type.

In the three decades that I have devoted a considerable portion of my time to the combating of tuberculosis, the work which I have done has been with the second or latter group, and has been focused on the idea that there can be no tuberculosis without tubercu-

* Delivered at the Seventh Annual Meeting of the American College of Chest Physicians; Cleveland, May 31 - June 2, 1941.

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lous infection. Therefore, our main attempt has been to control the sources of infection, and thus prevent its spread. This has been accomplished in a number of ways:

1) In the detection of the tuberculous individual having a positive sputum, and controlling that individual or the disease which he has, so that he is not capable of further spreading infection.

2) In the building and development of many institutions where such individuals might be housed and treated to prevent the spreading of infection.

3) In the work of the veterinarian in eradicating tuberculosis in cattle in this country, so that today less than one-half of one per cent of cattle housed for dairy purposes in this country show evidences of tuberculosis. Thus the almost complete absence of tuberculous infection in this most important article of food has resulted in an almost complete disappearance of the Non-Pulmonary forms of tuberculous disease.

To improve the constitutional resistance of individuals there has been developed:

1) An improved knowledge in dietetic habits, particularly as they refer to the basic food components, Proteins, Fats and Carbohydrates and our augmented knowledge of Vitamins and Mineral Salts.

2) An improved knowledge of the importance of adequate and proper housing.

3) A better realization of the avoidance of mental and physical fatigue and the presence of a happy outlook.

Let us compare the theses of both groups as I have given them above. In World War Number 1, there were certain levels of morbidity and mortality that had come unto certain nations with racial stocks limited to definite types within the confines of their own countries. If we were to consider these groups, on the basis of genetics alone, they should have remained stabilized at the levels which existed at that time, or should have shown a downward trend. But with the coming of War there was a marked congestion in urban centers, physical and nervous fatigue, inadequate housing and a depletion of food reserves. Intimacy of contact allowed for greater infection dissemination; and failure of constitutional resistance allowed increased disease development.

In the German cities with populations of

15,000 and over, the death rate, which in 1913 was 157 per 100,000, rose in 1918 to a maximum of 287. Individual cities like Vienna and Warsaw showed much worse conditions. In 1913 the rates for tuberculosis in these two cities were 302 and 306 per 100,000, respectively. By 1917, at the height of the war, these figures had risen to 425 for Vienna and 840 for Warsaw, declining in 1920 to 405 and 338 per 100,000 of population. Cities which, like Belgrade, passed through long periods of military occupation and food stringency showed maximum rates, rising even to the horrifying figure of over 1,400 per 100,000 during 1918. But the high rates did not continue following the resumption of industry and the return of fairly normal conditions.*

Even in these United States, the downward trend of tuberculosis mortality was halted in 1916 and reversed to new heights in 1917 and 1918—heights which approximated the

* Dublin, Louis I.: *Health and Wealth*, Harper & Brothers, 1928.

TABLE I
VETERANS ADMINISTRATION
*Admissions of Pulmonary Tuberculosis
Patients—World War*

<i>Fiscal Year</i>	<i>World War T.B. Admissions during Fiscal Year</i>
1940	9,039
1939	9,617
1938	9,510
1937	9,913
1936	9,106
1935	9,278
1934	7,921
1933	10,461
1932	12,060
1931	10,753
1930	10,852
1929	10,919
1928	12,143
1927	16,286
1926	16,905
1925	21,653
1924	19,127
1923	23,653
1922	38,962
1921	25,603
1920	Not available
TOTAL	293,761

Through the courtesy of the Honorable Frank T. Hines, Administrator of the Veterans Administration.

mortalities of 1907—a step backward of ten years.

The statistical data which I used at the beginning of this paper is shown in detail in tables as part of it and was received during the past month from the Administrator of the Veterans Administration, and the Surgeon Generals of both the Army and Navy.

Now in returning to World War Number I, in this country approximately 95 per cent of the age group selected for military service showed evidence of tuberculous infection by the presence of positive tuberculin sensitization reactions. The attempt to determine which of those actually had tuberculous disease was made but proved very ineffectual

as the above Veterans Administration statistics show. The cost in suffering and dollars has been great.

For the past two years, and especially in this last year, with the realization that this nation might again become embroiled in another world military catastrophe, attempts were made to stimulate the use of all modern scientific developments which could be applied to the detection and elimination of individuals with disease; particularly, disease of the respiratory tract. Many years ago we formulated the axiom that the chest x-ray film properly taken and interpreted delineates the presence and extent of pulmonary pathology with a greater degree of accuracy

TABLE II

Approximate Cost of Paying Compensation or Pensions to World War Veterans for Tuberculosis

Fiscal Year	World War—Service Conn. T.B.		World War—Non-Service Conn. T.B.	
	Cases on Rolls at End of Year	Estimated Disbursements	Cases on Rolls at End of Year	Estimated Disbursements
1919	54,855	\$35,490,848	9,621	\$3,111,630
1939	55,634	36,284,013	9,125	2,974,116
1938	53,389	36,961,282	8,430	2,766,084
1937	56,953	37,835,199	7,554	2,519,554
1936	58,092	39,218,136	6,775	2,310,870
1935	59,141	40,723,086	6,829	2,333,729
1934	57,270	33,213,528	6,756	2,135,880
1933	63,932	48,110,128	Not Available	
1932	63,371	50,450,092	"	"
1931	59,739	50,819,459	"	"
1930	55,598	44,707,672	Not in Effect	
1929	56,535	47,704,783	"	"
1928	60,690	50,951,043	"	"
1927	57,748	50,228,806	"	"
1926	48,150	42,562,626	"	"
1925	45,839	37,469,064	"	"
1924	39,099	35,091,509	"	"
1923	41,551	42,825,020	"	"
1922	36,600	37,722,156	"	"
1921	29,442	30,344,692	"	"
1920	23,091	23,798,970	"	"
1919	5,526	2,135,799	"	"
TOTAL	1,085,245	854,647,911	55,090	18,151,863

Through the courtesy of the Honorable Frank T. Hines, Administrator of the Veterans Administration.

than any other method of examination. That statement is no secret. What utilization is being made today of this method?

Our information is that all of the candidates for admission to the navy have chest x-ray studies made and every suspicious shadow is accepted as reason for a rejection. The army regulations allow the medical officers in charge of Induction Centers the privilege of using x-ray examinations at their own discretion when necessary. This allows of x-ray studies of all draftees before induction, of only selected ones, or of none. Only three of the nine corps areas have an almost complete file of chest x-ray studies of those inducted.

While at this time in the age group of draftees, 21 - 35 years, the incidence of tuberculous infection by tuberculin sensitization tests is approximately between 45 per cent and 55 per cent and this speaks for a smaller number who may be expected to develop tuberculous disease, yet the percentage case fatality records in this age group are relatively as high at this time as at the time of World War Number 1—and tuberculosis as a cause of death in this age group ranks also Number 1.

Various reports on present draftees evidence the rejection of one half to one per cent because of tuberculous disease. And we must also recognize that with 45 per cent to 55 per cent of draftees with tuberculous infection and only one half to one per cent showing frank tuberculosis, that there are an additional number with negative chest films at the time of admission to the military services who will later evidence tuberculous disease.

What measures should we recommend?

- 1) We must keep tuberculosis out of the army by:
 - a. Excluding it before it enters. This requires a minimum x-ray study and associated clinical study.
 - b. Realizing that tuberculosis can develop after induction, even though the draftee was found free from it in a chest film at the time of induction, and therefore the necessity of subsequent examination and his exclusion.
- 2) We must insist on the maintenance of a good constitutional resistance by furnishing proper housing for our armed

forces, a proper dietary and by a good psychology.

Finally, we must remember that the President has declared that a state of National Emergency exists. We, as leaders should not be derelict in proffering our expert advice in assisting the constituted authorities of our land. The President of these United States recognizes that the physical and mental stamina of the individual determines the physical and mental stamina of the nation and that "The Health of the people is the supreme law."

58 East Washington Street.

TABLE III

*Tuberculosis Patients Hospitalized
Fiscal Years 1921-1940
(All Wars)*

<i>Fiscal Year</i>	<i>Total T.B. Cases Treated</i>	<i>Approximate Cost</i>
1940	16,411	\$ 9,552,646.94
1939	16,103	10,094,376.08
1938	15,542	9,905,382.86
1937	15,135	11,388,875.61
1936	14,959	10,775,415.30
1935	14,382	11,355,582.16
1934	13,615	12,766,622.12
1933	17,869	17,430,778.80
1932	19,404	17,300,953.74
1931	17,632	18,539,941.17
1930	17,654	18,170,200.80
1929	17,466	18,036,861.00
1928	19,255	18,712,108.05
1927	24,251	20,219,078.88
1926	26,439	23,876,982.13
1925	29,067	24,730,206.00
1924	27,858	23,400,720.00
1923	34,989	24,667,248.00
1922	44,591	29,751,114.00
1921	39,480	18,026,568.00
1920	Not Available	
1919	" "	
TOTAL	442,102	\$348,701,661.64
		17,435,080.08
		\$331,266,578.56

Through the courtesy of the Honorable Frank T. Hines,
Administrator of the Veterans Administration.

The Advantages of the Standard Stereoscopic Examination of the Lungs with 14 by 17 Inch Films in the Diagnosis of Pulmonary Tuberculosis

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To all who are familiar with the capabilities of the standard roentgenographic examination of the lungs in disclosing or excluding the presence of early pulmonary tuberculosis, it seems needless to discuss the value of the method, for the extraordinary efficiency of this technic has been proved beyond all reasonable doubt. Indeed, it may confidently be asserted that few, if any, medical tests excel this procedure in reliability. The anatomic conditions favor accurate results, for any tuberculous lesions that on section could be seen with the unaided eye must produce visible shadows against the transradiant normal parenchyma. Visible depiction of the lesions is favored also by the slight magnification of their shadows beyond actual size and by the stereoscopic view, which latter factor practically insures against their concealment by shadows of the thoracic cage, shows their precise situation and distinguishes them from shadows due to extrapulmonic causes. By reason of these fortuitous factors, roentgenologic examination often will disclose minimal tuberculosis when symptoms, physical signs and results of laboratory tests are indecisive or even negative. Phthisiologists are keenly aware of this fact, and Sampson and Brown have said: "Today we have progressed to the stage where we call no man sound pulmonically until his stereoscopic roentgenograms have been found to be normal, and consider the roentgenologic study as much a part of the routine examination of the lungs as the stethoscope, or, indeed, as the examination of the sputum."

Like other roentgenologic technics, the standard stereoscopic examination with 14 by 17 inch films did not suddenly attain its present form or efficiency, but acquired both by slow development. At first, roentgenoscopic examination was considered sufficient. Then

came the single, screenless glass plate with long exposure at a short distance. Then progressive improvements in tubes, films, intensifying screen and stereoscopic apparatus gradually made the present procedure possible. Diagnostic interpretation also had to be learned slowly, by trial and error. For a long time prejudice derived from clinical data was common. Thus, the roentgenologist was inclined too readily toward the diagnosis of tuberculosis, and ostensibly roentgenologic diagnoses of the disease often were merely echoes of the clinical opinion. At one period, accentuation of bronchovascular markings without any other manifestations was construed to signify "peribronchial tuberculosis." Later on, refuge was taken in the ambiguous term, "peribronchial thickening." Obviously, the value of roentgenologic examination in establishing the presence or absence of minimal tuberculosis was not striking. During all this time, and after, clinicians also tended to be unduly keen in searching for evidence of tuberculosis. In 1917 and 1918 hundreds of American soldiers were sent home from France with medical certificates of disability from tuberculosis. At Ft. Bayard, where I was stationed, I had the opportunity of examining many of these men with the roentgen rays, which had begun to yield more trustworthy results, and many of the supposed invalids were found to have normal lungs.

In developing the roentgenology of the lungs it was necessary to establish criteria of distinction not only between normal and abnormal manifestations, but also among the various diseases, and the process was greatly favored by the general adoption of stereoscopic roentgenography with full-sized films, for the method furnished a uniform basis for comparisons. With this constant basis it gradually became possible to distinguish active from inactive tuberculous lesions in a large

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proportion of cases. Eventually, these accomplishments gave rise to fancies that roentgenologic examination was being offered as an autonomous, self-sufficient and invariably decisive diagnostic test, and that clinicians and roentgenologists were rivals in this field. Of course, these notions were short lived, for experience soon proved that correlation of clinical and roentgenologic data often is requisite for confident differential diagnosis or conclusive distinction of active from inactive disease, and that the two methods are complementary and indispensable to each other. Today, the standard stereoscopic technic is employed as a routine procedure almost everywhere—in clinics, hospitals and individual practice—and the record of its accomplishments speaks for itself.

In view of this record there would seem to be little reason for altering the method. Nevertheless, because it appears to be rather complex to those who are not actively engaged in its use and because two 14 by 17 inch films cost more than single or smaller films, other technics are being tried. Among them are fluorography—photographic reduction of the image on the fluorescent screen on sensitized films—and roentgenoscopy, supplemented by spot roentgenography for record. Fluorography has been applied with considerable success in surveys among civilians to disclose unrevealed instances of tuberculosis. At present, fluorography carried out with 4 by 5 inch films is prescribed for the examination of selectees for the United States Army, and selectees for the Navy are examined with 35 mm. film. Experience with roentgenoscopy plus spot roentgenography has been limited. This technic is tedious, and the single unsupported claim that it is superior to the standard method for disclosing early tuberculosis is not convincing. Simplification by these methods is more apparent than real, for all of them require special accessory apparatus, and none of them excels or equals the standard procedure in facility of application. From the standpoint of economy all the substitutes have the advantage of a slight saving in cost, but the saving per patient is not impressive. In extensive surveys for tuberculosis among civilians the aggregate saving by the employment of fluorography is substantial, and, since funds for such purposes have, in most instances, been limited

and difficult to obtain, the use of the method has been fully warranted. By employing fluorography instead of the standard method to examine selectees for the Army and Navy, the Government will temporarily save money, but there can be little doubt that eventually this economy will prove to be shortsighted and that the cost of caring for patients who have tuberculosis that previously was undetected, but which probably would have been disclosed by the standard technic, will vastly exceed the initial saving.

Fluorography cannot reasonably be expected to be as reliable as the standard method in the disclosure of early tuberculosis. In the first place, no image on the fluorescent screen is depicted as sharply or with as much detail as it is in the roentgenogram and since fluorography consists of photographing the image on the fluorescent screen, the finished photograph cannot be of better quality than that which is being photographed directly. Furthermore, in the process of photographic reduction and of subsequent magnification for study, some of the finer roentgenographic details inevitably will be lost. Unless the fluorograms are stereoscopic, small lesions will sometimes be hidden by bones. Systematic comparisons of the two methods have shown that 10 per cent or more of tuberculous lesions exhibited by the standard method are not discernible in fluorograms. Roentgenologists who have had experience with both methods have warned that fluorography is not a satisfactory substitute for the standard technic in the making of thorough clinical examinations.

The standard technic is not perfect, and no doubt a better method will some day be devised. Efforts to make roentgenologic examination of the lungs simpler and more economical are to be commended, for progress of any medical procedure in this direction is desirable. But the value of any diagnostic test is determined primarily by its reliability and, as a rule, this quality should not be sacrificed to obtain other advantages. To be acceptable, a new procedure must be equal or superior to the old in efficiency, and a worthy successor to stereoscopic roentgenography with full-sized films is not yet in sight.

Mayo Clinic.

Evaluation of Paper Films in Mass X-ray Surveys

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The evaluation of methods for mass radiographic surveys of chests for inductees into the armed forces of the United States must be considered from the following factors:

- 1) Diagnostic accuracy.
- 2) Rapidity
- 3) Availability of equipment.
- 4) Convenience of storage.
- 5) Unmistakable identification.
- 6) Ease of interpretation.
- 7) Cost.

The 14 x 17 cellulose film, naturally, is conceded to be the ideal medium for interpretation, but it is excluded from consideration in this discussion by reason of costs and rate of handling. Fluoroscopic examination is also eliminated as being too slow, and too inaccurate, as well as lacking a permanent record of the fluoroscopic image. This leaves us, then, to a consideration of the three other means for mass survey, namely, the 14 x 17 paper film, the 4 x 5 photofluorogram, and the 35 mm. photofluorogram. Since a discussion of the 14 x 17 paper film method has been assigned to me, it will be analyzed from the previously outlined seven points.

Diagnostic Accuracy

Every roentgen diagnosis depends upon two definite components: (a) technique, which has to do with the production of the medium from which interpretation is to be made, and (b) the ability and experience of the radiologist, making the interpretation.

If we concede that the 14 x 17 cellulose film is the ideal medium, then the only item lacking between this and the paper film is translucency. Both are the same size, both depend upon a direct action of the rays through the patient upon the intensifying screen to the emulsion, thereby eliminating the intermediary element of the fluoroscopic screen, both depend upon the same technical factors of milliamperage, kilovoltage, time, etc. We would, therefore, expect the two vital elements, detail and contrast, to be of an equal value, in either film or paper.

Our second item, the individual radiologist

making the interpretation must be given vital consideration. Up until several years ago, the 4 x 5 and 35 mm. photofluorograms were not used and up to the present time, these have only been available to but a few radiologists for comparison.

In a mass survey, such as has been contemplated in the army forces, it must be conceded that large metropolitan centers where the more experienced and capable radiologists are, will be in qualified hands, but we must consider the smaller communities also.

The writer feels that sufficient time and availability has not been had by the rank and file radiologist to depend entirely on the two other methods. Speaking from a personal experience of interpreting paper films on the chests of Selectees in the Philadelphia District, the writer is satisfied as to the accuracy of that method.

Rapidity

All three methods are ranked on about the same par when we compare rapidity of making the examinations. The problem, over and above all else, in the time factor, is the comparison of the time necessary to place the finished product before the radiologist for interpretation.

Teamwork between the specialist making the physical examination of the chest and the radiologist, is of paramount importance. Therefore, it seems to the writer that any method which permits of this should be given a higher rating. It cannot be denied that the better the cooperation between clinician and radiologist, the better it is for both of them as well as the Selectee whose chest is under consideration.

If we are to attain this set-up, it becomes imperative that the roentgenogram be taken, processed and interpreted by the time, or near the time, the Selectee reaches the chest specialist. This, practically, necessitates the interpretation of a wet film.

From my own personal experience, the paper film lends itself admirably to this re-

quirement, to the extent that it is more easily read in its wet state, than when dry and, certainly, lends itself readily to handling in the wet state. In my opinion, the smaller films should never be interpreted unless dry.

Availability of Equipment

Before any job can be done, one must have the necessary equipment. The two newer methods of survey have necessitated the development and manufacture of entirely new apparatus, and availability of some of their component parts have delayed their usefulness.

The paper film can be used in conjunction with any standard x-ray generating equipment having a capacity for making 14 x 17 films at the required technical factors, namely, 150 milliamperes at 85 to 90 KVP. Personal investigation informs me that the paper film itself is available in the necessary quantity.

Convenience of Storage

Here it would seem that the more bulky 14 x 17 film is at a disadvantage when compared to the 4 x 5 or 35 mm. I am reliably informed that now, however, small reductions of the 14 x 17 film can be supplied for filing purposes, at a very small additional cost. This procedure, therefore, permits the interpretation on the conventional 14 x 17, with a small replica for filing. I, also, believe that the paper film ranks in an equal manner with the small cellulose films for durability over long periods of filing.

Methods of Identification

The three methods use about the same means of identification, so that places no preference except that it would seem that ease of identification is enhanced by the size of type and numerals in the larger size film.

Ease of Interpretation

The 14 x 17 paper film is viewed by a fluorescent tubular electric bulb of the "daylight" type. This is mounted on a stand which is clamped to the table, and permits of almost unlimited changes as regards height and coverage of the film from any angle. The pile of cut 14 x 17 paper films, while still wet, are placed under the lamp which is then adjusted to suit the radiologist's vision. After

the film is interpreted, it is removed to one side, bringing the next in view. Viewing the wet paper film by this method is ideal in the writer's opinion, after a personal experience of having viewed and interpreted as high as 300 in about six hours without any eye strain or fatigue. This is in direct contradistinction to the question of eye strain in the case of the other two methods. I am reliably informed that not more than 75 of the smaller films can be viewed without rest or relief. This, necessarily, calls for relief in time or increase in personnel.

Cost

The rapid paper film method is estimated to cost 75 cents per case, and this includes all retakes.

This would seem more expensive when compared to the alleged cost of the other two methods.

When we consider the cost of equipment necessary for the making and taking of the 4 x 5 or 35 mm. films and the wear and tear on it as well as the break down of the tubes, plus the experience of men to run them, we are not far apart in cost per case.

Space will not permit a detailed discussion of the various costs for the production of the smaller film, but after a thorough personal investigation, I am convinced that there is a negligible difference in cost.

If the cost of tuberculosis, alone, from the last World War meant an approximate cost of \$960,000,000 to the Government and that \$10,000 is saved per each case picked up in the present survey, then who of us can quibble about this small difference.

Our routine at the Philadelphia Station for examining men is as follows:

The applicant appears in shorts with his case record and barracks bag, before a table with two clerks, one of whom enters his name, age and a serial number on a list; while the other makes out a perforated lead stencil bearing similar data, on an electrically driven stencil writing machine. A few feet away, there is set up a sectional portable dark-room, within which the paper films are fed to the cassette on one of its walls and in the rear of which are materials for developing and fixing.

Forty-eight (48) inches in front of where the film cassette is placed in the wall of the

dark cubicle, an x-ray tube is mounted and, of course, near this the generating outfit.

Two men, as a rule, work inside the cubicle, and two technicians outside. As the line of applicants form, each is instructed to hold nothing but his identifying stencil. One technician places him and his identification plate in position before the cubicle and the other makes the exposure at the height of deep inspiration.

The man at the cubicle signals to the inside, and the exposed 14 x 17 paper film is cut and passed to the developer and another section of film put in place.

The applicant is then instructed to make the rounds of the various other specialists for his examination. The chest specialists are placed last on the round, and after the first 20 or 25 have been passed, it is possible for the radiologist to keep well beyond the rate of examination.

This permits of a very close cooperation between the clinician and radiologist and is

the only satisfactory means of conducting such a survey. If retakes are necessary, the selectee is readily available.

The number of retakes, at our station, because of technical deficiencies and artifacts, have been less than one per cent.

Another feature of the paper film which I would also like to stress is its facility for examining extremities, or even spines. This feature has been very helpful to the orthopedic examiner.

Each day's quota of selectees is completely cleared before the examiners go home.

The films are next thoroughly washed in running water and placed in a special dryer, and are then ready for tabulation and filing.

In conclusion, the writer feels that the paper film method of mass radiographic survey, as conducted in our Philadelphia Station, is as near the ideal from every viewpoint, as is possible to attain.

1930 Chestnut Street.

The 4 x 5 X-Ray Film as a Diagnostic Screen

ROBERT E. PLUNKETT, M.D.*
Albany, New York

Control of tuberculosis in our armed forces is one of the many responsibilities confronting both military and health authorities during the present emergency. The physical strain of military training and the living conditions prevailing in Army tents and barracks present an excellent opportunity for the development and spread of the disease. For this reason, our first and most important task must be to prevent, as far as possible, the admission into Army units of active or potentially active cases of tuberculosis which, in time, might become dangerous foci of infection.

To what extent and by what means can this program be realized?

For many years it has been recognized that the x-ray is essential for the accurate diagnosis of tuberculosis. It is therefore necessary to provide a chest x-ray examination of each selectee if screening is to be effective. For this purpose, the induction stations

should be equipped with x-ray facilities capable of easily and rapidly producing large numbers of diagnostic x-ray films at a minimum cost.

Until a short time ago, the choice of this medium would have been limited to the 14 x 17 celluloid, or the 14 x 17 paper x-rays.

Recent advances in the field of fluorophotography, whereby it is possible to photograph the image on the fluorescent screen with small size films, have provided new opportunities which deserve serious consideration. Two types of fluorophotographic apparatus are commercially available, one which uses 35 mm. films, the other 4 x 5 films.

That the use of either of these types would effect a real economy in mass x-raying, as compared to the use of the ordinary full size films, is evident. But economy in cost is of value only when it is combined with simplicity of technique, diagnostic accuracy, and ease of interpretation.

It was for the purpose of appraising each of these factors that it was decided in Sep-

* General Superintendent of Tuberculosis Hospitals, New York State Department of Health.

September 1940 to undertake a comparative study in a group of 1,000 inmates of the Binghamton State Hospital for the insane.¹

The patients were x-rayed at the rate of 40 per hour, each with a 35 mm., a 4 x 5, and a 14 x 17 celluloid film successively. The films were interpreted individually by four members of the staff of the Tuberculosis Division, each of the small films being read before the 14 x 17 films. It should be stated that from ten days to two weeks were allowed to elapse between the reading of the different type films in order to avoid memory of films influencing interpretation. Finally, all the interpretations were compared.

The conclusions of this study may be summarized as follows: Of the 1,000 of each exposure, 975 14 x 17 films and 944 4 x 5 films were available for interpretation, the others being either missing or technically unsatisfactory. Unfortunately, considerable technical difficulties had been encountered in the operation of the 35 mm. x-ray unit, with the result that only 614 such films were technically satisfactory for comparative interpretation with the other films.

Sixty-two cases of clinically significant tuberculosis were found by the 14 x 17 films, of which 30 were in the minimal stage. While none of the moderately advanced and far-advanced cases were missed in the corresponding small films, 3.4 per cent of the minimal cases were missed on the 29 available 4 x 5 films, and 17.4 per cent on the 23 available 35 mm. films. In the group of healed reinfection cases, 4.6 per cent were missed on the 65 available 4 x 5 films, and 34.7 per cent on the 49 available 35 mm. films.

Since the main reason for the use of small films is the economic one, it is important to determine the final net cost of film for each case of clinically significant tuberculosis found by each method. The personnel required for each method being comparable, and without accounting for the original cost of equipment, the average cost of a processed 14 x 17 film was 65 cents, while that of the 4 x 5 film has been estimated at 6 cents, and that of the 35 mm. film at 3 cents. On this basis, and taking into account the num-

ber of retakes with 14 x 17 films necessary for diagnosis in each group, the net cost of films for each tuberculosis case found in this study would have been \$10.22 if 14 x 17 films had been used, \$2.08 if 35 mm. films, and \$1.85 if 4 x 5 films had been used. It will thus be seen that from the purely financial point of view, little difference exists between the small size films. The 35 mm. film itself is less expensive than the 4 x 5, but its final cost is slightly greater due to the fact that the 35 mm. film requires a greater number of retakes with the full size films for definite diagnosis. In our experience, for instance, 71, or 11.6 per cent of the 35 mm. films required such retakes, as compared to 22, or 2.3 per cent of the 4 x 5 films.

After due consideration of the results of this study, we concluded that while both fluorophotographic methods are relatively adequate for screening purposes in mass tuberculosis surveys, the 4 x 5 films are preferable because of their greater diagnostic accuracy and of the greater ease with which they can be read.

Soon after this study had been completed, the New York State Department of Health initiated and assumed responsibility for conducting a chest x-ray service for all selectees at the three induction stations in upstate New York. For this purpose, a 4 x 5 fluorophotographic unit was installed in Buffalo, a portable x-ray unit using 14 x 17 celluloid films was installed in Syracuse, and a unit using 14 x 17 paper x-ray films was installed in Albany. Physicians of the State Department of Health were assigned to be in charge of the x-ray phase of the induction process. The routine followed was practically the same at each station. The x-ray exposure was made following the selectee's registration, the film immediately developed and interpreted when still wet. A report of the interpretation was then submitted to the chief medical officer, usually before the selectee's medical examination had been completed. In instances when, for technical or diagnostic reasons, it was deemed advisable to make another exposure, the selectee was returned to the x-ray department before his physical examination record had been completed. This was rarely necessary when the 14 x 17 celluloid or paper x-rays were used, and in less than 5 per cent of the cases at Buffalo where the 4 x 5 films

¹ Plunkett, R. E., Weber, G. W., and Katz, Julius: "Comparative Value of Roentgen-Photographic Methods," *American Journal of Public Health*, August, 1941.

were used. This service was started November 25, 1940, and continued under the Health Department supervision until March 14, 1941. Beginning March 15, 1941, the Army authorities took over the responsibility for conducting the x-ray service, replacing our physicians with reserve medical officers.

The total number of men x-rayed at the three induction stations from November 25, 1940 to March 14, 1941 was 14,923. A total of 127 men, or 0.9 per cent, were disqualified from military service because of x-ray evidence of tuberculosis. In addition, 21 men were disqualified because of thoracic pathology other than tuberculosis.

Because of the different methods used and of special arrangements made, the cost of producing a chest x-ray varied in each station. For an average of 100 examinations a day, five days a week, the cost would have been as follows: In Buffalo, where 4 x 5 films were used, the cost would have been approximately 35 cents per man—10 cents for films, including 14 x 17 retakes, and 25 cents for personnel; in Albany, where paper x-rays were used, the Powers X-ray Corporation charged a flat rate of 25 cents per man, so that with 25 cents cost for personnel, the unit cost of the film would have been 50 cents; in Syracuse, where 14 x 17 celluloid films were used, the responsibility for the service was assumed by the Superintendent of the Onondaga County Tuberculosis Hospital and the Health Officer of the City of Syracuse. The Army reimbursed these local authorities at a flat rate of 75 cents per man x-rayed. These figures cover cost of films, chemicals for processing them, and salaries for civilian personnel. They do not include either initial cost or depreciation of equipment. The cost per man could be appreciably reduced by x-raying more than 100 men per day, which would be possible with the same personnel provided other conditions permitted.

Had the same method been used and the same arrangements made in all three stations, the cost for every case of tuberculosis found would have been \$88 if the 14 x 17 celluloid films alone had been used, \$62 if paper x-rays had been used, and \$44.50 if 4 x 5 films had been used. It must be noted, however, that the flat rate of 25 cents charged for the paper x-rays was offered mainly for the purpose of demonstrating the method, and it is

questionable whether this same rate could be maintained in the future. If we consider 50 cents as the more likely basic cost of this type of film, then the per capita cost of the 127 cases of tuberculosis would have been about \$91.00.

A similar correction should be made for the 14 x 17 celluloid films. We know that the cost of a processed 14 x 17 film is 65 cents, so that the rate of 75 cents charged in Syracuse would have left only 10 cents for personnel. By adjusting the cost of personnel in Syracuse to that of Buffalo and Albany, the per capita cost of the 127 cases would have been \$109 if 14 x 17 celluloid films had been used in all three stations.

Another important factor related to the cost and ease of handling of the various types of films is adequate storage space. Calculations of weight and cubic feet of space have been made for the 14 x 17 cut paper, the 14 x 17 celluloid, and the 4 x 5 films. From the standpoint of cubic feet of space, the 14 x 17 celluloid films require 32 per cent and the 4 x 5, 94 per cent less space than the paper x-rays. With regard to weight, the 14 x 17 celluloid films weigh 13 per cent and the 4 x 5, 92 per cent less than the paper x-rays.

This experience has shown that, irrespective of the x-ray method used, it should be relatively inexpensive to x-ray all prospective recruits prior to their induction, and thereby keep all cases of reinfection type tuberculosis out of the Army. The establishment of such a procedure in all induction stations would be a long step forward in the control of tuberculosis in the Army and would more than justify its cost in the resultant savings.

As a result of actual experience with the different methods now available for producing chest x-ray films, it is our conclusion that until some cheaper and equally accurate method is developed, the 4 x 5 roentgenographic method is the most economical and most practical one. It has opened for us new areas of opportunity for service, and thereby tuberculosis case-finding, universally, should be approaching a new and most productive era. Adequate case-finding facilities, through the use of this method, should be within the reach of every agency responsible for a program of tuberculosis control.

State Department of Health.

35 mm. Fluorography as Used by the U. S. Navy

COMMANDER ROBERT E. DUNCAN, MEDICAL CORPS, U. S. NAVY
Washington, D. C.

The Surgeon General of the Navy has "put me on the spot," so to speak. He has asked me to address this meeting on the subject of "35 mm. photofluorography as used in the Navy." One month ago, I had the honor of representing him at the annual meeting of the National Tuberculosis Association in San Antonio, Texas. At that meeting I read a paper on this same subject. Inasmuch as most members of this College probably attended that meeting, this discussion will be more or less repetitious. When I called Admiral McIntire's attention to this state of affairs he said that in his opinion, the subject was of sufficient importance to merit repetition—so the responsibility rests in part with him.

The problem of tuberculosis in the Naval Service is one that we have always considered to be of primary importance. This fact has been demonstrated again and again under normal conditions, and now in the face of a national emergency and a rapid expansion of our Naval Forces, we are particularly anxious to take every reasonable step looking to the elimination of personnel presenting themselves for admission into the service who have tuberculosis in any form.

Tuberculosis, as you all know, is a disease of those who live in close relationship. Crowded community life is inseparable from a warship's environment. Life aboard ship entails over-crowding in some instances, cramped quarters, long tours of duty in confined spaces, exposure to inclement weather and duty in the tropics, where the tuberculous do very poorly under the best of conditions. Because of these and other conditions peculiar to the Navy, the physical standards concerning tuberculosis must of necessity be extremely rigid. No applicant showing any degree of adult type tuberculosis is acceptable. This includes minimal arrested tuberculosis appearing on x-ray films as apical scars or localized fibrous strands. Likewise, persons developing tuberculosis while in the service are retired and are not subject to recall to active duty, even with long standing arrest and minimal lesions.

We have recognized the fact that pulmonary tuberculosis will not be detected by physical examination alone in many instances, and that some form of radiology must be used before final determination is made as to an applicant's availability for the service. Several methods of x-ray examination are available. They are:

- 1) Fluoroscopy.
- 2) The standard 14 x 17 celluloid film.
- 3) The 14 x 17 paper film, both roll and cut sheets.
- 4) The 4 x 5 miniature fluorograph.
- 5) The 35 mm. miniature fluorograph.

The medical department of the Navy has given serious consideration to all of these methods. The standard 14 x 17 inch celluloid film would, of course, be ideal. But the high cost of film and processing and the high requirement for storage and preservation make it entirely impractical. With recent improvements, the 14 x 17 inch paper film, both roll and cut sheets, is almost as trustworthy from the diagnostic standpoint as is the celluloid film. But here again we have the difficulty of storage and processing and a still relatively high cost. This brings us down to fluorography or photography of the fluorescent screen. Here we have two methods to consider, the 4 x 5 inch and the 35 mm. miniatures. The 4 x 5 inch has some advantages over the 35 mm. but it also has several real disadvantages. The 4 x 5 inch is large enough for unprojected viewing and gives a fairly good idea of the extent of the disease without magnification. The unit cost of the film is low but is still about six times that of the 35 mm. film. The processing is slower and more expensive and the filing problem more complex. But the chief disadvantage is that it requires a very large, expensive lens made of imported optical glass, and there are few of these lenses available in this country.

After carefully weighing the advantages and disadvantages of all of these methods, the medical department of the Navy has decided that fluorography with the 35 mm. film is the very best solution to its problem.

In 1939, experiments with fluorography using 35 mm. film were instituted at the Naval Medical School's Research Department at Washington, D. C. As no apparatus was available commercially, a home-made unit was constructed. The general procedures as outlined by deAbreu and Lindberg were followed. At first the films obtained were not so very encouraging, but with the development of improved fluoroscopic screens, fast film and improved developer by commercial firms and improvement in our technic, results were achieved last Fall which we considered most satisfactory. Those results convinced us that this method meets the requirements of our main objective—that is the weeding out of the tuberculous from among our recruits in a rapid, economical and efficient manner. The ease of operation and processing, the small storage requirements and the very minimal cost cannot be approached by any other method. The original installation is the main item of expense. The processing is very simple and inexpensive and the films cost less than one cent each.

During a period of mobilization, speed may be an important factor. We have demonstrated that a smooth working team can easily turn out from 100 to 150 films per hour. As a matter of fact, Holfelder in Germany, working with an expert team of technicians reached a peak turnover of 400 per hour and his average was from 200 to 300 per hour. However, it has been estimated that the peak at our largest Naval Training Station should never exceed 500 a day and probably would average less than 200 a day. At present, we are not exceeding the rate of 80 examinations per hour in the interest of careful posturing and technic and some regard for the life of the x-ray tube.

It should be clearly understood that we are not using these miniature films for fine diagnostic work. They will merely act as a sieve to screen out the abnormal from the normal chests. This method fulfills its purpose by pointing out the existence of a pathological deviation. In any case showing a lesion or even a questionable area, a standard 14 x 17 inch celluloid film is made for confirmation and accurate diagnosis. Our experimental work and experiences with this method at the Norfolk, Virginia Training Station lead us to believe that not more than 1 per cent

of significant tuberculosis will be missed by using 35 mm. fluorography. We are convinced that this method has definitely passed the experimental stage and that it is an ideal method for mass thoracic survey work.

We have constructed seven of these units for use at our points of entrance in the Naval Service; that is, at Naval Training Stations and Marine Corps Bases. All seven are now in operation and I understand that all men entering the Naval Service now receive a chest fluorogram. Upon arrival at the training station, all recruits are placed in quarantine. During this quarantine period, a thorough physical examination is repeated and a Kahn Test and a chest fluorogram obtained. Where a suspicious case is found with a 35 mm. fluorogram, the individual is subjected to a second x-ray of the chest, at which time the standard 14 x 17 film is used. Following that, and before any determination is made, the suspect is transferred to a hospital where the case is studied clinically before final determination is made as to his availability for the service. No diagnosis of tuberculosis will be made on the basis of an x-ray examination alone.

The following radiological findings are considered disqualifying:

- 1) Any evidence of reinfection (adult) type tuberculosis, active or inactive, exclusive of slight thickening of the apical pleura.
- 2) Evidence of active primary (childhood) type tuberculosis.
- 3) Inactive primary tuberculosis, if the degree or extent of involvement appears to be of present or future clinical significance.
- 4) Evidence of fibrinous or serofibrinous pleuritis.

Since the first of January, 1941, this method of chest survey has been in operation at the Norfolk, Virginia Naval Training Station. During the period from January 1, 1941 to May 21, 1941, photofluoroscopic examinations of 11,078 recruits were made. These men had already passed two or more stringent physical examinations and were therefore a selected group. Yet, of these recruits, 26 men showing soft infiltration in the lungs, 4 with fibrosis and incomplete calcification and 1 with marked pleuritis were transferred to the hospital for further study and disposition. The vast majority of these recruits were from 17 to 20 years of age.

It is interesting to note that six tuberculosis suspects and three heart cases were found in 1,111 Naval Reservists recently examined. As these men were in a higher age group than the Recruits, these findings were not remarkable. Also out of 54 men examined for commissions or call to active duty who were in a still higher age group, one case of moderately advanced, active pulmonary tuberculosis was discovered.

Other conditions were noted as follows:

Completely calcified areas in the parenchymal lung tissue	13
Healed hematogenous tuberculosis or fungus infection	6
Marked old pleurisy	8
Mitral type heart	4
Hypertensive type heart	2
Dextrocardia	2
Eventration of the diaphragm	4

Our incidence of adult type tuberculous infection found radiologically amounted to approximately 5/10 of 1 per cent.

The Australian Army has been using 35 mm. fluorography as a method of mass chest survey of recruits since the 23rd of December, 1939. They examined 22,000 men during the first two months that the method was in operation. In the August 24th, 1940 issue of the British Medical Journal, Lt. Col. Eric L. Cooper, Medical Corps, Australian Army reports on his personal examination of 9,000 of these microfilms. From a comparative standpoint, I believe it would be of interest to study his findings. Forty-nine cases of active pulmonary tuberculosis, of which 15 showed definite evidence of cavitation, were discovered. Medical Boards later confirmed the diagnosis of active pulmonary tuberculosis in all but one of this group. Besides these active cases, there were 22 in which radiological evidence of lung fibrosis was present and 42 films showed evidence of calcification in the lung fields that suggested old healed tuberculous infection of the so-called adult type. In the 9,000 films examined, there was evidence of adult type tuberculosis in a total of 120 cases, the incidence of tuberculous infection thus amounting to 1.33 per cent in a selected group of adults. Their incidence as shown by these figures is over twice that found in our group of recruits. I believe that this greater incidence is probably due to a higher incidence of tuberculosis in the gen-

eral population of Australia and also in part to the fact that our recruits had passed through at least two stringent physical examinations prior to the radiological study.

Of course, we have no way of knowing how many cases were missed. Considerable time must elapse and serial films must be obtained before that information is forthcoming. At first our roentgenologist was very liberal with confirmatory standard 14 x 17 inch x-ray films, but after a little experience, he found that by paying meticulous attention to the details of technic and by careful posturing of the men, only 1 or 2 confirmatory x-ray films, out of each 100 miniatures taken, were necessary. The trained roentgenologist experiences little difficulty in adjusting to the smaller image and picks out deviations from the normal with no greater difficulty than in the larger film. I am convinced that most of the disappointing results obtained by some groups making comparative studies have been due to faulty technic, improper posturing of patients and poor developing. The man viewing these microfilms should require the same degree of technical perfection as in a 14 x 17 inch film.

In fact, it is more dangerous to attempt to read a poor 35 mm. film than a poor 14 x 17 inch film. Thirty-five mm. fluorography should be considered in the same light as any other x-ray procedure and, if anything, a higher standard of technical perfection should be demanded because of the small size of the film produced. In reading the films, most workers use a projector which by magnifying 6.8 times gives an image about one-half the size of the original screen image. Our men seem to prefer the Leitz viewer which magnifies about four times. It has a rheostat attachment by means of which the intensity of light can be changed for different densities. Reading by either method is tiring to the eyes so that one radiologist should not attempt to read more than from 70 to 100 successive films without a rest period. These miniature films are filed with the man's duplicate health record which is kept in the archives of the Bureau of Medicine and Surgery at Washington, D. C. They will therefore be readily available for later serial study when that procedure becomes practical.

It has been suggested that a tuberculosis

survey of personnel already in the service should be instituted. Unfortunately, that is entirely impractical as the various units of the fleet are scattered over areas far removed from our Training Stations. However, the method can be used for procedures other than the survey of recruits. For example, at the Washington Naval Hospital, recently, two cases of pulmonary tuberculosis, one far advanced and one moderately advanced in extent, were received from the Navy Yard within a period of 30 days. It was learned that both men were quartered in the same barracks, which housed some sixty men. The Navy Yard was contacted and the remaining men quartered in that particular barracks were given photofluoroscopic examinations. By this means, another case of moderately advanced open pulmonary tuberculosis was discovered in this group. The detection of that one case certainly justified the procedure. Likewise, when a case of tuberculosis is received from one of our vessels in port, a chest survey of the entire crew of that ship can be conducted with very little difficulty.

Although 35 mm. fluorography has not had an extended trial in the Navy as yet, the results, so far, indicate that from a practical working standpoint it is a manifestly satis-

factory method of mass tuberculosis survey work. In this connection, I want to strongly re-emphasize one point and that is—that these miniature films are to be used for screening only and not for fine diagnostic work.

In an article on the subject of 35 mm. fluorography appearing in the January 1940 issue of the *Journal of Roentgenology and Radium Therapy*, Doctor I. Seth Hirsh concludes: "It's greatest field of usefulness is in the study of the lungs, particularly for the determination of tuberculous changes. It is not intended as a method of fine differentiation as to the type of lesion, but the early apical lesion, the cavity and the fibrotic and calcific changes are demonstrable. The image of the pulmonic fields has neither the contrast nor the detail of the large film but, nevertheless, the record is sufficiently clear, to permit the differentiation of the normal from the abnormal lung."

That statement, I believe, clearly expresses the opinion of most workers in this field. Our experience with 35 mm. fluorography certainly supports these conclusions.

*U. S. Naval Hospital,
Washington, D. C.*

NOTICE

Seeking an outstanding physician for an important position, the Los Angeles County Civil Service Commission has just announced an open competitive examination for Medical Director of the County tuberculosis sanatorium. The salary for the position is \$500 a month and the usual three-year County residence requirement has been waived, thus allowing all qualified men who are United States citizens to participate in this examination.

In order to qualify to take the examination, men between the ages of 35 and 55 must have been graduated from an approved medical school with a degree of M.D. and have had at least five years' experience as a specialist in the treatment of tuberculosis. Of the five years' experience, three or more must have been in a responsible administrative and executive capacity in a sanatorium or hos-

pital.

Application blanks and additional information regarding the position can be obtained from the office of the Civil Service Commission, Room 102, County Hall of Records, Los Angeles, California. Applications must be filed with the Commission by Wednesday, October 15th.

Olive View Sanatorium is located in the foothills of the San Fernando Valley approximately 25 miles from the center of the City of Los Angeles. In addition to 1150 patients at the Sanatorium, 300 patients are housed in a sanatorium camp at Acton, California, and 100 patients are housed in private institutions by contract with the County. Medical care and treatment of all patients is under the direction of the Medical Director of Olive View Sanatorium.

Proceedings of the Military Affairs Committee*

American College of Chest Physicians

OPENING REMARKS

BENJAMIN GOLDBERG, M.D., *President*
American College of Chest Physicians
Chicago, Illinois

Fellows of the College, you may remember that in the course of our last annual meeting the President of this country issued a statement to our people that there was at that time impending an international crisis which would call for putting this country on a military basis. This would involve the calling of certain age groups for special training in the armed services of our country.

The then President of this organization, Dr. John Peck, immediately appointed a Committee on Military Affairs with the sole object of extending to the Government of this country the experience and resources of the Fellowship of this College, as it might benefit the physical status of those who were to serve in the armed forces of our country. Studies were to be made and a plan which might preclude the induction of individuals having diseases within the chest, was to be immediately worked out and submitted to the heads of the various Governmental units.

We are met here today after one year to hear reports of that committee, to learn in retrospect the accomplishments of their earnest endeavors and to give thought to any future plan or program that might assist our Government and country. We also have with us a distinguished officer representing one of the armed services of this country who will discuss some of the problems in that Service.

We who sit here today must not forget that this country was founded on the basis of freedom of thought and action, and a reward for the ingenuity of individuals who put forth effort in such improvement. You and I both have had opportunities to benefit others and

ourselves. Our achievements are the result of having lived under this form of Government. I am sure you feel with me that this is the only form of Government we wish to live under and, therefore, we must do our utmost to give it our fullest support.

Dr. Charles Hendricks, who has served in the military forces and reserve military forces of this country since the year of 1912, is Chairman of the Committee on Military Affairs and he will take over the meeting at this time.

C. M. HENDRICKS, M.D., *Chairman*

Committee on Military Affairs,
American College of Chest Physicians
El Paso, Texas

Our committee is deeply grateful for the large attendance at this luncheon. It is evidence of your intense interest in tuberculosis in its relation to our armed forces. We are all quite familiar with the mistakes and the shortcomings in the handling of the tuberculosis problem during the first World War. However, I would like to say a word in defense of those medical officers who served as chest specialists on the tuberculosis examining boards at that time. These officers were handicapped in many ways. First, the tuberculosis examining boards did not accomplish their examination of the first million men until after they had been inducted into the service. Therefore, all cases of tuberculosis discovered, at once became eligible for treatment and pension. Second, during this time Army regulations required a positive sputum in each case before a soldier could be discharged on account of pulmonary tuberculosis. The enforcement of this regulation resulted in large numbers of soldiers each day, in all the large Army cantonments,

* The following is a complete transcript of the reports and discussions of the Luncheon meeting of the Military Affairs Committee, held at Cleveland, Ohio, June 2, 1941.

being sent to the hospital for observation and sputum examination. If, at the end of 30 days, the sputum was negative, the soldier was returned to duty, regardless of the fact that the members of the tuberculosis examining boards were thoroughly convinced that the soldier had pulmonary tuberculosis. After several months of this procedure, regulations were changed eliminating the required positive sputum. Third, x-ray examinations, even of suspected cases, were not authorized. This was a serious handicap. The members of the various tuberculosis examining boards at that time were thoroughly convinced that because of the aforementioned handicaps they were not discharging many cases that should have been discharged.

No doubt, the large load of tuberculous veterans is due, in great part, to the handicaps above mentioned. However, two other circumstances, I am quite convinced, have added to this load. First, the severe and widespread flu epidemic of 1917, '18, and '19 played its role. Second, laws passed by Congress after the war also contributed to this load by adding presumptive and aggravated cases to the legal list of tuberculous veterans.

With these existing situations as an object lesson, the medical departments of our Armed forces are taking steps to eliminate as far as possible these handicaps and mistakes. Both the Army and the Navy agree that officers and men will be x-rayed upon their entry or induction into the service; this to be accomplished as soon as possible. The question of time and cost, as well as the question of filing space, had to be considered, and for that reason, experimentation with various types of x-ray procedure and sizes of film has been carried on by both the Army and the Navy.

The medical department of the Navy has spent a great deal of time and research on a new and inexpensive method of x-ray. The Surgeon General of the Navy has been kind enough to send Commander Duncan to us to present the results to date with the 35 millimeter films now being used by the Navy. You will hear from him in a few minutes.*

Gentlemen, you have in your hands a printed report of the Military Affairs Committee. I will now present that report.

* See page 333 for Commander Duncan's paper.

Report of the Military Affairs Committee

During the Annual Meeting of the American College of Chest Physicians, June 8-10, 1940, at New York City, the following resolution was telegraphed to President Roosevelt:

Whereas: The trend of present events would seem to call for the immediate action on the part of the government of the United States to protect its interests.

Whereas: The President of the United States has stressed the great necessity for immediate and complete aid for all democracies.

Be it Resolved: That we, the Fellows of the American College of Chest Physicians, meeting in annual session in New York City, are in whole-hearted accord with the sending of such immediate aid and that in the event of need, we, the Fellows of the American College of Chest Physicians, do offer our services to the government of the United States of America.

John H. Peck, M.D., President.

In accordance with this, there was established a Committee on Military Affairs. The President of the College appointed the following Fellows of the College to serve on this Committee:

Dr. Charles M. Hendricks, El Paso, Texas,
Chairman.
Dr. Hugh A. Kinghorn, Saranac Lake, N. Y.
Dr. Ralph Matson, Portland, Oregon.
Dr. Edgar Mayer, New York City.
Dr. J. Winthrop Peabody, Washington, D. C.
Dr. Joseph Post, Philadelphia, Pennsylvania.
Dr. Walter E. Vest, Huntington, West Virginia.

This committee was charged with representing the College in assisting in every way possible the essential work of preparedness for national defense.

Your committee decided at the outset to accomplish two things—First, to make a complete survey of all qualified chest physicians in the United States and its possessions in order to determine their availability should their services be required. Second, to complete and offer "A Suggested Plan for the Rapid and Efficient Examination of Chests."

The Preparedness Questionnaire was mailed to 600 chest specialists, and 550 were returned completed. 250, or practically one-half, proved to be ineligible for military service because of their physical condition or being over 64 years of age.

It was interesting to note that less than 10 per cent of those eligible were members of the Medical Reserve Corps of either the Army or the Navy. There are about 300 qualified chest specialists, according to this survey, who are eligible for reserve commissions, either in the Army or the Navy.

Your committee is proud and happy to report that every one of the 550 completing the questionnaire, regardless of his physical condition or age, expressed a willingness to serve if called. The average age of those eligible is slightly more than 44 years. Completed questionnaires were received from all of our possessions, the District of Columbia, and every state but one.

A file of these completed questionnaires was made by states and presented to the Medical Department of both the Army and the Navy.

The reaction of the two services was as follows:

The Surgeon General's office of the United States Army stated: "It is not felt that this office will be able to utilize the questionnaires, although the Surgeon General hopes that he may feel free to call upon the College for information regarding the qualifications of certain individuals for specific assignment."

The office of the Surgeon General of the Navy stated: "We wish to thank you for the very complete set of questionnaires which we received under separate cover."

"The Reserve section of this Bureau is preparing letters to such members of the College of Chest Physicians who are within the age limitation for appointments in the Medical Corps of the Naval Reserve and who are apparently physically qualified for such appointments."

During the time the above-mentioned survey of chest specialists was being made, your committee hurriedly completed a "Suggested Plan for the Rapid and Efficient Examination of Chests." Our greatest difficulty was in arriving at a unanimous decision on the x-ray procedure. The question came up about the advisability of using 14x17 films in all cases. It was agreed that this was the most efficient method, but that the cost might be prohibitive. The question of paper films was discussed, and because they were less expensive, but still were of the 14x17 variety, it was thought at that time that the paper film was the most desirable, and that the equipment required by paper films would be more easily available than the machines required for the photo-fluorograph, using 4x5 films or the micro-film photo-fluorograph, 35 millimeter. Since your Committee's plan was developed, we find that in some corps areas the paper film is being used very satisfactorily, and that in the opinion of many the 4x5 film is equally satisfactory for screening purposes; and that the Surgeon General of the Navy is highly gratified with the results obtained by the 35 millimeter film.

Your committee forwarded the following "Suggested Plan for Rapid and Efficient Examination of Chests" to the Army, the Navy, the Public Health, and the chief medical officer of the Veterans' Bureau:

A SUGGESTED PLAN FOR RAPID AND EFFICIENT EXAMINATION OF CHESTS

The following suggestions are respectfully submitted:

1. All officers and men of the Army, Navy and Marine Corps, as well as all who may be inducted into the service, be examined by x-ray.
2. Every officer and man be x-rayed upon discharge from the service.
3. That the x-ray film made at discharge be placed with the film made on induction into the service and both films then be placed in the hands of the United States Veterans Bureau as early as is feasible. That the film or a report of a selectee found to have tuberculosis be sent to his family physician, or the public health officer of his community.
4. That the same method of x-ray and type of film be adopted by all the military services thus making for uniform records.
5. That a history sheet be completed by the chest specialist and that the history be attached to each x-ray film.
6. That the history sheet contain the following data and questions: Name, Address, Occupation. Has there been tuberculosis in your family? Have you ever lived, or been associated with, tubercu-

lous patients? Do you cough? Expectorate? Expectorate blood? Have you had pain in the chest? Dyspnoea? Influenza? Pneumonia? Asthma? Hay Fever? Chest Injuries? Inspection: Lagging, Shape of Chest, Abnormalities.

7. *Physical Examination:* It is our opinion that all chests should be examined by auscultation because many recruits may have bronchitis, or bronchial asthma, which cannot be picked up by x-ray. While it may be unnecessary to prescribe certain instructions to known qualified chest specialists, it is well to remember that auscultation is the most important procedure, and that auscultation is incomplete when the subject is not properly instructed as to how to "breathe in," "breathe out" and cough. Any moist rales that persist after this type of breathing and coughing has been repeated several times would disqualify, or at least demand further examination, of the person being examined.

8. *Sound - proof, or semi - sound - proof booths* should be provided for the examiner. (Some of the members of this committee served as chiefs of tuberculosis examining boards in 1917 and 1918, and found that it was practically impossible in many instances to do a thorough auscultation because of noises such as bands playing, noises incident to construction, drilling of recruits, etc., near the building in which the examinations were being held.)

9. *Evaluation of x-ray plates:* Only medical officers known to be proficient in reading chest plates should be assigned this duty. It should be known that these officers can recognize a minimal lesion. It should also be known that they are not inclined to read positive findings into the picture when obviously not present. Great harm can come, both to the armed forces and the individual recruit if proficient evaluation of chest plates is not guarded. Careful instruction regarding the above should be issued and followed.

10. *There should be a medical officer with sufficient rank, and known to be a fully qualified chest specialist, in charge of each group of medical officers assigned as chest specialists and evaluators of x-ray plates.*

11. *Type of x-ray film:* It is believed that the paper film is the most desirable because of its size and cost. It is obvious that celluloid films (14x17) are the most desirable, but are prohibitive on account of cost. The miniature photo-fluorograph on a 4x5 film would seem to be desirable, but at present is not developed to a degree of perfection warranting consideration. The micro-film photo-fluorograph on 35 millimeter moving picture film has aroused considerable interest, but up to date, the diagnostic quality of the tiny film photo is open to serious question.

12. *Type of X-Ray Unit:* This should be portable, preferably mounted upon a truck. The type of film employed would naturally determine the type of x-ray unit; therefore, if the paper roll film is decided upon, a unit especially designed for the use of the paper roll film should be chosen. If a single film, paper or otherwise, is used, any standard x-ray unit is satisfactory.

13. *X-Ray Procedure:* This is proving to be a difficult problem because of the time involved between the filming of the recruit and the evaluation of the chest film. As yet no solution has been arrived at as to how the x-ray procedure can be developed so as not to slow down the process of examining recruits. We have, however, the following suggestions to offer:

First: That the filming of the chest be the first medical procedure.

Second: That a developing unit be provided with x-ray unit, capable of developing rolls of ten, or up to twenty-five exposures.

Third: That an artificial drying unit also be supplied.

If the above developing unit proves to be out of the question, it is further suggested that single paper films be used in cassettes, that at least 100 cassettes be available, that a developing unit and artificial dryer be available; that a special lead-lined room be provided for filling cassettes. With the proper team work on the part of the entire personnel connected with the x-ray department, cassettes can be passed immediately after exposure to the developing room. When emptied, the cassettes will be passed to refilling room and again passed through a lead lined window to the x-ray unit.

A single film can be developed and artificially dried in a maximum of 55 minutes. Each film, then, would be available for evaluation in at least one hour after the x-ray exposure. If the x-ray team began work from one-half hour to an hour before the rest of the medical team, and the filmed recruits were held until the medical team reported, the recruits could then pass through in the order they were filmed. By the time the first recruit had passed through the medical team, his film would have been evaluated by the evaluation team. Therefore, the recruit's physical examination, including x-ray and its evaluation, would have been completed before he reported to the quartermaster for uniform and equipment. Unless this procedure, or a better one is used, recruits will necessarily be held up until x-ray plates have been read.*

14. *In order that* uniform chest films may be had, a definite procedure of technic should be adopted and its use insisted upon by all x-ray technicians employed in this service. It is therefore desirable that all x-ray units be of the same type and make.

15. *In the adoption* of a definite technic procedure, consideration of the fact that different physicians have different desires as to the density of the plate, should be made. Therefore, to avoid controversies among the medical officers assigned for the evaluation of the films, a technic should be prescribed that would produce a happy medium between the very light film and the dark film.

The reaction of the various departments concerned are as follows:

United States Veterans Bureau: "The Veterans Administration heartily favors the timely formulation of a program looking to the thorough physical examination, clinical and laboratory, of officers, warrant officers, and enlisted men for enrollment in the military and naval forces, and like examinations at the time of discharge of soldiers, sailors, or marines from such service.

* This description of the Rapid Paper Film Method applies to the original method introduced in 1931. Recently a modification of this method, which also uses the inexpensive but highly sensitive and efficient x-ray film in rolls, has been developed especially to meet the needs of the Army, by shortening time between the making of the exposures and the completion of the processing of the exposed plates. Under the new method individual 14 x 17 radiographs are processed immediately and are ready for interpretation by the Induction Board radiologist within 15 minutes after exposure. The exposures are made at the rate of two or more a minute, and the plates are read while still wet.

"We have carefully read your suggested plan. Its effectuation would be practicable and advisable, and necessarily distinctly protective to the government's interests, both as to procurement of men capable of rendering adequate military or naval service, and as to the subsequent claims for disability made against the government by persons discharged from the military or naval service. We find the details of the proposals so concrete and comprehensive that we have no suggestions to offer."

The office of the Surgeon General of the United States Army:

"This office has considered through the past year the possible means of effecting the routine chest x-ray examination of all individuals inducted into the military service. We have considered standard 14x17 films, the Powers' rapid x-ray technique and the use of photo-fluorography with the 4x5 film and the 35 millimeter films. In this study we have had the advice of the Subcommittees on Tuberculosis and Radiology of the National Research Council.

"In this entire problem the plans and policies of the War Department are necessarily taken into consideration. One of the chief questions in conducting x-ray service by induction boards is the limited amount of time permitted. It is the policy of the War Department to dislocate men from their domestic occupational pursuits as little as possible and, with this in mind, a stipulation has been set up that registrants appearing before induction boards, except in a small proportion of cases, must have their examinations completed on that particular date. In setting up plans for chest examinations by induction boards it, therefore, becomes necessary to adopt a rapid technique which permits development of the films and their interpretation within a few hours. This necessarily excludes the Powers' rapid film technique which requires return of the exposed roll of films to the central developing plant for processing with a necessary delay in interpretation of the films and return of the information to the induction board of from one to four or five days.*

"It was the opinion of the Subcommittee on Tuberculosis and Radiology of the National Research Council that the 4x5 micro-film method was an acceptable one. The recent report of Dr. Frederick Tice concerning the use of the 4x5 micro-film technique in Chicago appears to support their opinion. In view of that opinion, in which our Army radiologists concur, steps have been taken to supply the Army with this type of equipment. As rapidly as this equipment becomes available it is planned to install it at induction boards for the routine x-ray examination of the chests of all registrants appearing before such boards.

"I agree with you that it is theoretically desirable that the Army and Navy employ the same method of examination. It should be stated, however, that whether men go into the Army or the Navy, Selective Service Regulations contemplate that all shall be examined by induction boards. Since induction examinations have been designated as an Army function, the plan eventually used will apply to enlisted personnel entering the Navy as well as those going into the Army.

"Though this office feels that the 35 millimeter technique has possibilities, it was rejected for the present in favor of the 4x5 films.

"The matter of x-ray examinations upon discharge has not yet come up for decision. It will undoubtedly be a matter for consideration by the War Department when the present problems con-

cerned with bringing men into the Army have become more thoroughly standardized.

"You raise the question of the disposition of films made of registrants who are found to have pulmonary tuberculosis. As such individuals will be rejected, the War Department will have no interest in their films and no reason can be seen why such films should not be utilized by state health officers in their follow-up work in such cases."

The office of the Surgeon General of the United States Public Health:

"The question of providing some means of capitalizing on the case-finding tuberculosis problem incident to the examination of registrants for selective service has concerned us for some time. I don't know that it would be practicable for the state and local health departments to obtain the actual film made on rejected registrants; but I do believe that a plan can be worked out where all registrants examined and found to have tuberculosis will be reported to the appropriate health agency."

The Office of the Surgeon General of the U. S. Navy:

"We appreciate the suggested plan for the Rapid and Efficient Examination of Chests. This plan is similar to the one now being conducted by the medical department of the Navy. Within the next few days, methods will be established whereby all recruits will have an x-ray examination of the chest.

"We will, from time to time, request help and advice from our recognized experts in chest diseases and x-ray on the progress of our work."

Since August, 1940, the medical examining boards of the United States Army have been governed by the following regulations:

A.R.—40—105

Paragraph 62. *Standards for consideration for commission.* (a) Chest Roentgenograms will be required of every candidate for commission in the regular army. No candidate with Roentgenological evidence of re-infection (adult) type pulmonary tuberculosis, active or inactive, will be accepted for commission in the regular Army, and no candidate with Roentgenological evidence of primary (childhood) type pulmonary tuberculosis will be accepted if the degree or extent of involvement appears to be of present or future clinical significance. Chest Roentgenograms will not be made routinely in the examination of applicants for commissions in the National Guard of the United States or the Officers Reserve Corps, or in the case of those seeking Federal Recognition as officers of the National Guard; however, the condition stated in the preceding sentence, if disclosed, will be considered disqualifying for appointment in the National Guard of the United States and the Officers Reserve Corps, and for Federal recognition as officers of the National Guard.

(b) In other respects, the standards are the same as for applicants for enlistment.

Since the chest Roentgenogram is to play such a large part in determining the physical qualification of officers and men entering the military service, it was deemed wise to make a survey of the latest thought among our leading radiologists and clinical phthisiologists with the view of determining a composite, authoritative opinion as to what constitutes Roentgenological findings which would be disqualifying by the Roentgenogram alone.

Following are the questions and answers—The

answers were divided into two groups, Roentgenologists, and clinical phthisiologists:

QUESTIONNAIRE

1. Is childhood type tuberculosis (evidenced by calcific deposits) confined to the lower two-thirds of the lung fields?

Answer: R. 100% No.
CP. 100% No.

2. Is it possible to also occur in the upper third of the lung fields?

Answer: R. 100% Yes.
CP. 100% Yes.

3. What is your understanding, Roentgenologically, of adult type of tuberculosis, minimal, inactive?

Answer: R. About 65% believe that adult type, minimal, inactive, should show a lesion not involving more than the volume of one lung above the second rib and third dorsal spine, with no softening, no cavity, and definitely fibrosed. 30% gave varying answers that could be summed up by saying they believe a small amount of fibrosis, either with or without calcific deposits, extending to the periphery in either or both lungs, most usually in the apex, constitute sufficient indication. 3% believe that differentiation between childhood type, and adult type, minimal, inactive, cannot be determined Roentgenologically. 2% believe fibrotic or calcified lesions limited to the periphery of one or both lungs show an adult type of tuberculosis, minimal, inactive.

CP. 90% believe that minimal adult type of tuberculosis, inactive, is a lesion not involving more than the volume of one lung above the second rib and third dorsal spine, with no softening, no cavity, and thoroughly fibrosed. 6% believe that differentiation between childhood type and adult type, minimal, inactive, cannot be truly determined Roentgenologically. 4% stated that adult type, minimal, inactive, is a calcified or fibrotic lesion limited to the periphery of the lung.

4. Would you say that a calcific deposit, small, without positive evidence of fibrosis in the upper one-third of the lung field is evidence of adult type tuberculosis?

Answer: R. 94.5% No. 5.5% Yes.
CP. 96% No. 4% Yes.

Many of both groups stated that this could be due to a Ghon's nodule.

5. If there were the same condition, with slight evidence of fibrosis, would you consider it adult type?

Answer: R. 72.5% No. 27.5% Yes.
CP. 80% No. 20% Yes.

Many of both groups stated that fibrosis also accompanies healing in childhood type.

6. If you do consider it adult type of tuberculosis, would you consider it disqualifying in an officer who is otherwise qualified according to all physical standards and who has never had any symptoms of active tuberculosis?

Answer: R. 89% No. 11% Yes.

Many qualified their answer of "No" by stating "depending upon extent of lesion, and should be studied individually." Others stated that under most circumstances such individuals are as good, or better, risks than those with negative Roentgenograms. Others qualified their answer "Yes" by stating "if under 40 years of age."

CP. 92% No. 8% Yes.

Most of the 92% answered "No" without any

qualifications. One of the 8% answered "Yes" without qualifications. The others qualified their answers by stating that the fibrosis should be sufficiently extensive; while others qualified their answer "No" by stating that age, history, and ability to carry on in civil life should be taken into consideration.

7. In the case of enlisted men or selectees, would your opinion be the same?

Answer: R. 94.5% Yes. 4.5% No.
CP. 88 % Yes. 12 % No.

Several of both groups qualified their answer "No," stating that age should be considered.

8. Do you believe apical pleuritis (Roentgenologically) in the absence of all other defects should be disqualifying?

Answer: R. 94.5% No. 5.5% Yes.
CP. 96 % No. 4 % Yes.

Most of those answering "Yes" stated that apical pleuritis must be definitely diagnosed.

9. Do you believe that all calcific deposits in otherwise healthy individuals, are due solely to healed tuberculosis?

Answer: R. 100% No.
CP. 96% No. 4% Yes.

Several stated that there were certain geographical locations in the United States where calcific deposits in the lungs had been proved to be non-tuberculous.

10. Do you believe that Roentgenological evidence of a minimal amount of fibrosis is positive evidence of healed, adult type of tuberculosis?

Answer: R. 94.5% No. 5.5% Yes.
CP. 96 % No. 4 % Yes.

11. Can fibrosis occur from any disease or condition other than tuberculosis?

Answer: R. 94.5% Yes. 5.5% No.
CP. 100 % Yes.

Both groups stressed the fact that fibrosis may be the result of many pyogenic infections, abscess and trauma. Many of both groups stressed the fact that peribronchial thickening must not be confused with fibrosis.

12. Do you feel that the various types of Roentgenological findings, above-described, should be disqualifying in otherwise healthy, robust individuals who have positively negative histories of clinical tuberculosis?

Answer: R. 94.5% No. 5.5% Yes.
CP. 96 % No. 4 % Yes.

Most of these of both groups answering "Yes," qualified their answers by saying the diagnosis of adult type tuberculosis must be definite.

13. Do you believe in all cases, physical examination, history, age and occupation should be considered along with Roentgenological findings before disqualifying an officer or man?

Answer: R. 94.5% Yes. 4.5% No.
CP. 92 % Yes. 8 % No.

Many of those answering "No" stated that age should be considered.

14. Do you believe that excessive inhalation of dust, or a history of a severe attack of influenza would produce Roentgenological findings similar to those of adult type of tuberculosis, minimal, inactive?

Answer: R. 72.5% Yes. 27.5% No.
CP. 88 % Yes. 12 % No.

A large percentage of the questionnaires were accompanied by many pertinent remarks on the

Roentgenogram diagnosis of pulmonary tuberculosis. The summary of the thought is as follows: "Films of most adult lungs show a certain amount of thickening of the bronchial markings as a result of previous infections which have no pathological significance. It requires long experience in the observation of films combined with complete clinical data to reduce errors in interpretation."

One of our outstanding radiologists in America has this to say: "The interpretation of the densities observed on x-ray films of the chest demands a knowledge of normal anatomy, the pathogenesis of disease, primarily or secondarily involving the chest, the dynamic forces exerted by pathological processes, and finally the correlation of the densities, symptoms and physical findings. Much confusion will be avoided by concentration between Roentgenologist and internist."

Practically all men of both groups in their remarks stated that in a problem as grave as the one under consideration there should be "team work" between the Roentgenologist and the clinical phthisiologist, both of whom should be men of experience and known ability in their respective fields.

A copy of this survey was mailed to the Surgeon General of the Army, the Surgeon General of the Navy, and to each member of the Subcommittee on Tuberculosis and Radiology of the Research Council.

The Surgeon General's office of the United States Army has notified this Committee that the Subcommittee on Tuberculosis of the National Research Council has been asked to assist in clarifying and probably revising the chest standards now laid down by Army regulations.

The Surgeon General's office of the United States Navy informs us that cases having the following Roentgenological findings are considered to be available for disqualification:

1. Any evidence of reinfection (adult) type tuberculosis, active or inactive, exclusive of slight thickening of the apical pleura.
2. Evidence of active primary (childhood) type tuberculosis.
3. Inactive primary pulmonary tuberculosis, if the degree or extent of involvement appears to be of present or future clinical significance.
4. Evidence of fibrinous or serofibrinous pleuritis.

"If any of these suggestive Roentgenological findings by the 35 millimeter film are noted, the final decision in each case will not be made until a check Roentgenological picture on a 14x17 film has been made and careful consideration has been given to the clinical status of the individual. In other words, where a suspicious case is found with the 35 millimeter film, the individual is to be subjected to a second x-ray of the chest, at which time the 14x17 film is used. Following that, and before any determination is made, the suspect is transferred to a hospital where the case will be studied clinically before final determination is made as to his availability for the Service.

All members of the Research Council expressed their appreciation of the survey just mentioned and stated that the information would be "Helpful in our work and in clarifying our views. You no doubt know our committee of the National Research Council is now considering the several problems involved in your questionnaire. We hope to have a report soon."

Your Military Affairs Committee has considered it a pleasure and an honor to serve, and we wish to thank every member of the American College

of Chest Physicians as well as the heads of the various United States Government services and the National Research Council for their kind consideration and cooperation.

Respectfully submitted:

Dr. Charles M. Hendricks, *Chairman*
 Dr. Hugh A. Kinghorn
 Dr. Ralph Matson
 Dr. Edgar Mayer
 Dr. J. Winthrop Peabody
 Dr. Joseph Post
 Dr. Walter E. Vest.

I believe it would be of great interest to all of us to have this report thoroughly discussed.

Discussion

J. WINTHROP PEABODY, M.D.

Washington, D. C.

At our last annual meeting, held in New York City, the College offered its services to the Government of the United States in a time of great emergency, and there was appointed a committee on Military Affairs charged to represent our College in assisting in every way possible the work of preparedness for National Defense.

This Committee at the outset decided to make a survey of qualified chest physicians in order to determine their availability should their services be required, and to complete and offer "A Suggested Plan for the Rapid and Efficient Examination of Chests."

A questionnaire was mailed to 600 chest specialists, and of this number 550 were returned completed. Practically one-half proved to be ineligible for military service because of their physical condition, or being beyond the age limit.

This Committee is happy in the fact that every one of the 550 completing the questionnaire expressed a willingness to serve if called. A file of these completed questionnaires was made by states and presented to the Medical Department of both the Army and Navy.

The Committee felt that more would be accomplished through personal contact with headquarters in Washington. Hence, immediately following our annual session in New York City, members of this Committee had personal interviews with the officers in charge

of the U. S. Veterans' Administration, and the Surgeon General of both the Army and the Navy. In each instance, your Committee members were most cordially received.

The following suggestions were presented: that all officers and men of the Army, Navy, and Marine Corps be x-rayed before induction into service, and again at time of discharge; that the films taken at time of induction and discharge be filed with the Veterans' Administration; that the film of a selectee found to have tuberculosis be sent to his family physician or the public health officer of his community; and that the same method of x-ray and type of film be adopted by all military services, thus making for uniform records. In presenting these suggestions we recommended a uniformity which would answer the purpose in every detail and thereby screen out those unfit for service. We expressed the wish that every recruit be given, as well, a thorough physical examination, thus avoiding a repetition of the mistakes made during the First World War. The opinion of the executives of the Veterans' Administration was that the result of such a procedure would be of great aid to them at a later period.

We were received in the office of the Surgeon General of the Army by Colonel Hillman. Several visits were made there and during these sessions we carefully outlined the plans of the College, and stated our willingness to serve the country's needs.

Captain Sutton of the Navy, representing the Surgeon General of that service, gave very attentive consideration to the suggestions as outlined by our Military Committee. We were invited to visit the Naval Hospital and to inspect the pioneer work which they were doing with the 35 millimeter film—at that time in a more or less experimental stage. Subsequently Captain Sutton sent us several of these films for our own inspection, and invited us to follow on with the Navy in the development of this technique. Later, it was our privilege and pleasure to attend a medical meeting held in the Naval Medical School where an evening was spent in discussing the merits of this procedure.

Today, at this Committee Luncheon, we have had the honor of having as our guest speaker, Commander Robert E. Duncan of the United States Navy who has given us a

very splendid presentation of the Navy's experience with the 35 mm. film.

Your Committee, under the very able direction of Colonel Hendricks, has endeavored to obtain all the information possible in order that our College might contribute its share to the great work of National Defense.

Since the chest Roentgenogram was to play such a large part in determining the physical qualifications of officers and men entering the military service, it was deemed wise to make a survey of the latest thought among our leading radiologists and clinical phthisiologists with the view of determining a composite, authoritative opinion as to what constitutes Roentgenological findings which would be disqualifying by the Roentgenogram alone. These completed questionnaires will be found in the printed report of the Military Affairs Committee. They proved to be of great interest and I trust that each and every one of you will read them. I shall not discuss them at this time because Doctors Matson, Post, and other members of the Committee who follow me on this program will do that for you.

In conclusion, I wish to call your attention to the excellent work rendered by our Committee Chairman, Doctor Charles M. Hendricks of El Paso, Texas. He has, by his untiring efforts, covered a vast subject which is of vital importance to our nation today.

Discussion

RALPH C. MATSON, M.D.
Portland, Oregon

I want to pay tribute to Commander Duncan and Dr. Hendricks for their reports. Dr. Hendricks and Dr. Peabody did most of the work on this report which bears my name, among others of the committee.

I am very frank to admit that I did not do very much. In fact, all I did do was fill in the questionnaire and give some advice by letter. These two gentlemen did all the work, as far as I know.

Regarding the question of history, in the case of the examination of a selectee, unlike that in civil life, it is practically worthless in many instances. A man who wishes service will deny all symptoms such as hemorrhage, and a man who wishes no service will claim

such disabilities.

Our experience, for instance, in the first draft at Camp Lewis where my brother, the late Lt. Colonel Ray W. Matson, was Chief Medical Examiner, and where I succeeded him when he went over seas, comprised nearly fifty thousand men. These men had been inducted into service before they were examined. Many of them had been in camp weeks and sometimes months and had already been assigned to divisional units. Examining troops after they have once been mustered into service is quite a different story than examining selectees upon arrival in the camp, because, as we found there, it disrupted organizations and training, and oftentimes valuable well-trained personnel were dismissed from service because of disabilities.

This was not the only bad feature. We found, on examination of the first draft of somewhat under fifty thousand men, an enormous amount of tuberculosis. I mean to say it ran around between five and six per cent.

You would be surprised to know that many of these soldiers were sent to camp from the southwestern states by doctors who thought that military life would be of benefit and that the open air and exercise would be the best thing in the world for them.

After the experience of the first draft it was decided, on the arrival of the 78,000 second draft men assigned to Camp Lewis, that they should be examined before they were inducted into service, so we were between the devil and the deep sea. We had men arriving at the rate of 10,000 on the first of the month. These men were assigned to us at the rate of 1,500 a day. They had to be in or out in 48 hours. I mean by that, that these men had to be examined quickly and an opinion given, "in or out."

If we rejected too many and they went back home because they had a cold, and shortly went back to work, the community howled, and then the provost marshal was on our trail saying, "Why send these men back?" and they went to another camp for examination.

If they broke down on our hands we had to explain to the Surgeon General. We knew that we had a certain number of cases of tuberculosis in any outfit and that we must find them. In some camps the ratio some-

times ran as high as three per cent. We decided, at Camp Lewis, where we had no authority to use any x-ray equipment at all, that we would use it.

Dr. Hendricks has already mentioned it was not authorized and it was not.

My brother and I contacted x-ray supply firms when they called to interest us in x-ray equipment. We said, "All right, put in a couple of x-ray outfits. If they prove satisfactory we think the Surgeon General will authorize the purchase." We knew very well that he would not. We used them until an inspector came and said, "Where in hell did you get this stuff? Get it out!" Out it went, and after he left we got some more in under the same veiled assurance to other firms.

Here was my position. I had 10,000 men reporting on the first of every month. They came to me at the rate of 1,500 a day, and I had assigned to me forty doctors, most of whom had been thrown out of infirmaries and active service units because they were physically unfit, and many of them had not had a stethoscope in their ears for fifteen years. A lot of them were unfortunates hoping for a better living, and any type you can think of. Most of the younger men had been assigned to active service with troops or in field or base hospital units. We got what was left. When they couldn't use them for anything else, and they were still in the Army, we got them.

We soon realized that the examinations made by these doctors were utterly worthless. One could not accept the man's statements regarding his history because the man who wanted service would lie about things just as the one who did not, so we drew up what we called an information blank of our own. The examiner was advised that when a selectee came in for examination he would be asked certain questions by the clerk. For instance, had the selectee ever had a prolonged fever? Had he had pneumonia? Had he had "water on the lung"?—we used that expression. Had he ever spit blood? Had he had typhoid fever? What sort of contact had he had with tuberculosis? And the answer was checked on the blank, which had to be done quickly. This man, if the blank was checked, was marked with a blue pencil on his chest and went in for a fluoroscopic examination.

So we examined all selectees that way, and

if we had fifteen hundred men going through, the chances were that seven hundred would be fluoroscoped. They went in and out of the unit like sheep going through a sheep dip.

In the fluoroscopic room we had stenographers trained to take their notes in the dark. A man came in and gave his name and the organization, and it was written down. Then all fluoroscopic findings were written at once in the dark, and out he went. If we found anything abnormal we marked certain symbols with grease pencils on the man's chest, and when he emerged from the fluoroscopic room they were picked up by the examiner. The result was that it did not matter much how faulty an examiner was, because the man was bound to be fluoroscoped if the answers were "yes."

The result was that of the seventy-eight thousand men of the second draft, our rejection rate was 6/10 of 1 per cent. It was about 3 per cent in other camps and that was because of the fluoroscopic work at Camp Lewis. Of that entire group, we had x-ray findings on 120,000 men.

These records have been of enormous value to me in the years following demobilization. After the Armistice the Surgeon General sent me to Fitzsimmons General Hospital as Chief of Staff, where I had the opportunity to check up on the men who went to that institution from various sources. I learned at what camps they had been examined and who was responsible for it.

Of over 12,000 men admitted to Fitzsimmons General Hospital, the number who had broken down as a result of Camp Lewis' examinations was 1/1000 of 1 per cent. We followed the records for five years through the United States Public Health Service and Veterans Administration. A lot of these figures have been published by me in the American Journals, so I will not go into that except to call attention to the fact that there is no question about the necessity of making x-ray examinations of every soldier.

Those of you who had military service will remember the instructions of 1917 that Colonel Bushnell wrote regarding the requirements for rejection or acceptance into service. I know you must remember the controversy that arose over the question of rales. After all, in these physical examinations our rejections were based largely on whether one

heard moisture or not. Therefore, in the camps where they did not have x-ray facilities the question was whether or not moisture was heard on coughing—that was the one finding which was of value in the absence of x-rays. The point which Colonel Bushnell raised, regarding rales following cough, was of unquestionable value.

It seems to me that as a result of our tragic experience in the last war, we are practically bending over backwards in this war. At least six months ago we were.

I had so many officers referred to me because of my previous war experience. One of the first to come was a very able officer, Captain Schumacher who, for seventeen years, had been captain of the Oregon National Guard Rifle team which had won the championship of this country for just as many years, and who had not missed a day in National Guard service throughout his career. He was a First Lieutenant in the Portland Police Bureau who never missed a day of duty, was six feet, two inches in height, and weighed two hundred pounds. He was x-rayed when the Guard was Federalized and some calcified deposits were found which were interpreted as re-infection type of tuberculosis, and he was rejected. Appeals were made and nothing could be done about it. General White asked me to study his case. I did and wrote a report on him and said I absolutely disagreed with the interpretation of the film and that it was not, in my opinion, a reinfection type of tuberculosis but a primary one, and according to the standards of the last war, he was absolutely fit for service, and they finally accepted him. I personally witnessed him lead his company through Portland streets after the California Field maneuvers. No finer looking officer could be pictured and yet our country would have lost a valuable officer because of x-ray misinterpretations.

Another officer who wanted service in the Artillery, whom I considered to be in the very best physical condition was rejected because an examining doctor heard a sibilant rale in his chest. In the rejection report it was stated that he had been hospitalized for twenty-four hours because it was thought he had asthma. Out he went. It was reported that he must be physically fit to act under any conditions of field service. Here was an instance of where the true history of this man

was valuable. He was a mountain guide on Mt. Hood. He climbed it as many as seventeen times during each summer. No one took into consideration his physical endurance. Certainly a man who could climb Mt. Hood fifteen or seventeen times during the summer would be fit for military service.

I don't know of anything else I can add except to pay tribute to these gentlemen who have contributed to this meeting.

Discussion

JOSEPH C. PLACAK, M.D.
Cleveland, Ohio

If I may be permitted to tell of some of the things we are doing in this particular area, I would like to do so. Before this emergency started, we realized how serious a problem tuberculosis was in the last war. Speaking as an old soldier, and actually coming in contact with some of the problems of tuberculosis in the last war, I knew that it was imperative that something be done to avoid some of the mistakes that were made before.

We wrote to everybody we thought might be concerned, from the President of the United States down, but never got to first base. We finally made connections, through David Dietz, who is Science Editor of the Scripps Howard papers, with the state authorities who gave us permission to make fluoroscopic examinations of the selectees.

The Anti-Tuberculosis League of this county is equipped with a trailer which has a fluoroscopic and an x-ray unit in it. Up to the present time, we have examined many thousands of potential soldiers and have found about 100 who had significant changes in the lungs. A number of these were minimal actives, some moderately advanced and some far-advanced.

Our procedure is to take those who have significant findings and have them x-rayed on 14 by 17 film. Then our group of seven fluoroscopists review the films and draw their conclusions therefrom. These men are all competent, well-trained fluoroscopists who have a wide experience and whose opinions are worthy of consideration. Those cases which are regarded as significant are then reported to the local health officers who are requested to follow them up and prove wheth-

er the lesions are active and hospitalize them. Some of the lesions picked up have been arrested minimal and subsequently followed up by the board of health.

We are using this same plan in industry and have examined thousands of workers in the various industries.

Our fluoroscopists work in two-hour shifts. Ample time is given for rest in between shifts. This work is just a screening process and we consider it a very valuable and cheap means of case-finding.

Discussion

NELSON MERCER, M.D.
Philadelphia, Pennsylvania

I speak as a buck private in the rear ranks of our organization of chest physicians, but I have had the privilege of serving all the way from private to Lieutenant Colonel in the Medical Corps of the Army and the National Guard, and I think that qualifies me to make a few remarks. Let us get down to business, and talk over this splendid report. I never saw it before this afternoon, and when I glanced over it, I was thrilled to know that we have such men as Dr. Post and Dr. Matson and Dr. Hendricks, the Chairman of this committee, and that they have produced such a wonderful report.

Now, here is the point, gentlemen. A report, as you know, those who have been in the Army, doesn't count unless you get down to work and do something about it. Now, that is the whole thing in a nutshell. Let us do something about the report now. Our government is in the same fix as all the other democracies up to this moment. We are too late and doing too little to help England and help ourselves in this emergency.

From now on let's do something to get us out of the doldrums, and let these people in Washington know that this organization of Chest Physicians is here to be of some constructive service to our Army.

To get down to what I meant by doing too little and being too late, Mr. Hitler can testify to that. He is laughing about it. It tickles him to death for all of us to be too little and too late in our efforts. But he gets there on

time, and he is ahead of his schedule at present.

I read a news dispatch from Washington in the Cleveland Plain Dealer yesterday morning, and it said that only 50 per cent of the men who have been drafted into our Army have been x-rayed.

I could not believe it when I read it, because I understand the rule is that every man and every officer, before he can serve his country, has to be x-rayed. That is one of the primary requirements, and I could not believe that only 50 per cent of the men had been x-rayed. I asked a doctor about his state, and he said that very few men in his state had been x-rayed. I will not say from which state he comes.

As far as Philadelphia is concerned, Dr. Post has interpreted 225 paper films in one day, and every man that has passed through his center has been x-rayed. He has been there from eight o'clock in the morning until any time at night to complete the x-ray interpretations and consultations with the clinicians if necessary. That is the usual procedure.

Dr. Goldberg, as the President of our organization, I respectfully request you and our Military Affairs Committee, to find out why only 50 per cent of the men have been x-rayed to date.

RESOLUTIONS COMMITTEE

C. HOWARD MARCY, M.D., *Chairman*
Pittsburgh, Pennsylvania

A resolution was presented calling upon the Surgeon Generals of the Army and of the Navy to speed up the x-raying of all soldiers and sailors in the armed forces of the country. The resolution was unanimously adopted.

CLOSING REMARKS

BENJAMIN GOLDBERG, M.D.
Chicago, Illinois

I am sure we all wish to thank Dr. Hendricks and Commander Duncan and the various members of the committee, and those who have participated in this discussion for having given us the valuable information presented today.

Examinations for Tuberculosis*

Roentgenographic Findings of 41,809 Inductees and 9,541 National Guardsmen in New York City

HERBERT R. EDWARDS, M.D., and DAVID E. EHRLICH, M.D.
New York, New York

Chest physicians and health and welfare organizations interested in tuberculosis control have consistently advocated the taking of a routine chest roentgenogram of all men entering the armed services. This has been accepted in principle by the medical personnel of the Army and Navy.

Emphasis on this problem is to be found in an article by Ramsey Spillman on the value of radiography in detecting tuberculosis in recruits. His analysis of statistical data from the U. S. Veterans' Administration indicated that the cost of a case of tuberculosis to the government in a veteran of the World War has been about \$10,000 per man to date. Also, he stated that within the next five years the total cost of service connected disability payments would reach the staggering total of approximately one billion dollars.

Clara E. Councell, in a recent report on war and infectious disease, stated that between April 1st, 1917 and December 31st, 1919 there were 27,274 primary admissions of tuberculosis to the U. S. Army, an annual rate of 12.2 per thousand.

In the early part of 1940 the National Research Council set up its committee on the various medical sciences to correlate the best thought of leaders throughout the country for the benefit of the federal services. A subcommittee on tuberculosis of the General Committee on Medicine was organized. In the terminology of tuberculosis and chest diseases certain revisions were recommended and accepted and are now incorporated in Mobilization Regulations No. 1-9 as of August 31st, 1940.

A directive from the Adjutant General's Office of the U. S. Army under date of October 28th, 1940 stated in part:

"3. At induction places other than at Army stations, arrangements with state or civilian roentgenological laboratories will be made at

the earliest practicable date. When it is feasible to supply these laboratories with government films, timely requisitions will be made to the Surgeon General by corps area and department surgeons. Payment for these films and for the services of civilian roentgenologists may be made, however, by corps area surgeons from procurement authority.

"4. Should belated reports reveal the presence of defects disqualifying under the provisions of Mobilization Regulations 1-9 in individuals who have been inducted and forwarded to reception centers or training stations, such reports will be transmitted to these respective stations and action taken to effect the prompt discharge of such individuals on certificates of disability."

Thus this order provided an opportunity for local agencies to set up and operate a roentgenographic service for men inducted and to be compensated by the government until such time as the Army could assemble its equipment and assume full responsibility. It would have been almost impossible for the Army to acquire and set up facilities for the routine roentgenographing of all men inducted through the Selective Service Act immediately after the act went into effect. Unfortunately, only a few local agencies in the country were aware of this opportunity or were sufficiently interested or equipped to conduct routine roentgen examinations for the corps area commanders.

The Bureau of Tuberculosis of the New York City Department of Health has been engaged in the mass roentgen ray survey of the apparently healthy population as a method of case-finding since 1933. As of December 31st, 1940 a total of 330,923 individuals have been examined. An extensive report of some of these findings was published as a supplement to *The American Review of Tuberculosis*. These surveys have been accepted as a basic part of the tuberculosis control program in New York City. Thus, our interest in

(Continued to page 350)

* Abstract of article published in the Journal of the A. M. A., July 5th, 1941, Vol. 117, No. 1. Prepared by David E. Ehrlich, M.D.

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MODERATE RATES

Descriptive Booklet on Request

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Ralph C. Matson, M.D., & Marr Bisailon, M.D.

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Portland, Oregon

(Continued from page 348)

providing a similar service for inductees and members of the State National Guard was based on well founded experience. Accordingly, our mass roentgen ray services, which were made possible through a project with the Works Progress Administration, were offered to the surgeon of the Second Corps Area prior to the directive that was issued by the Adjutant General's Office on October 28th, 1940.

The Second Corps Area included the states of New York, New Jersey and Delaware. This report is concerned with that part of the entire area known as the Southern New York District, comprising New York City, Long Island and the five counties of Westchester, Orange, Rockland, Dutchess and Putman. This area represents approximately 52 per cent of the population of the entire second Corps Area, yet the number of men inducted in this district is reported to be about 60 per cent of the entire corps area.

The inductees were usually roentgenographed on arrival at the station to allow as much time for processing of films and reading as possible. As the recruit was supposed to be cleared through all examinations and made ready for induction and transfer to a reception center (Fort Dix or Camp Upton) by 1 p. m., or not later than 2:30 of the same day, it was necessary to have a report on the roentgenogram within an hour or less.

At the time of rejection all men residents of New York City were given an appointment within the next two or three days to appear at the Health Department's Central Chest Clinic for further study. At that time, a complete study was made of the case, including history, physical examination, sputum, fluoroscope, roentgenograms in one or more positions, iodized oil or whatever other examinations were deemed essential to arrive at a final diagnosis. If the findings warranted rejection under Mobilization Regulations 1-9, a report was sent to the chairman of the local draft board indicating that the inductee was permanently rejected. If, on the other hand, the subsequent examination proved the original findings to be of no significance, a letter to the chairman of the local draft board indicated that, unless there were other rejections against the applicant, he could be referred back to the induction center as satis-

factory.

The method of application of the roll-paper survey unit and its modification so that the films could be developed at once is described in the original article.

The types of pathology other than pulmonary tuberculosis that were causes for rejection were diseases such as bronchiectasis, pneumonitis, atelectasis or extensive pleural changes.

The following data summarizes the induction work in the Southern New York District which was carried out by the Department of Health, New York City, for the Army as follows:

During the period November 25th, 1940, to January 15th, 1941, inclusive:

INDUCTEES

no.	ave. age	total reject.	active tbc.	arrested tbc.	non tbc.
6609	25.7	90 or 1.36%	29 or 0.44%	46 or 0.7%	15 or 0.23%

During the period January 16th, 1941 to March 31st, 1941, inclusive, the induction work was done by the Army, but the rejected individuals were sent to Department of Health for further study:

INDUCTEES

no.	total reject.	active tbc.	arrested tbc.
35,210	491 or 1.4%	139 or 0.4%	250 or 0.71%

During the period January 27th, 1941 to March 10th, 1941, thirteen local National Guard Units were federalized and the induction work was carried out by the Department of Health:

TOTAL

no.	ave. age	total reject.	active tbc.	arrested tbc.	non tbc.
9541	24.2	115 or 1.21%	41 or 0.43%	56 or 0.59%	18 or 0.19%

Since this report has been published, because of the large number of cases of tuberculosis discovered, local draft board No. 1, which comprises a large district in downtown east side Manhattan within which

(Continued to page 352)

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MRS. C. R. DOTSON, Superintendent

(Continued from page 350)

Chinatown is situated, requested the Department of Health to make a survey of all the registrants preliminary to other examinations and about 4000 men were studied. While the details are not yet tabulated, a large number of cases were found (about 8.5 per cent in the first 1000 studied) and it justifies the opinion of Edwards that from the public health aspect an x-ray examination of all local draft board registrants would give a fairer sample of pathology discovered in this age group.

The Army Induction Center has initiated in New York within the past few months the method begun in Pennsylvania of calling in the Inductees thirty days prior to the induction for their general army induction physical examinations. In the case of rejected individuals, this obviates the necessity of their giving up civilian occupations and thereby prevents the working of economic hardships such as the loss of a job or the abandonment of an established business or profession.

Although not yet functioning, there is contemplated by the Army a mobile motorized induction center unit which will travel to the outlying rural areas and make easier the lot of these inductees. It is presumed that an x-ray set-up will be part of the unit.

Experience and knowledge are the best teachers in any method of x-ray examination

adopted. The 14 x 17 standard celluloid x-ray film study has longest stood the test of time for the best of detail and accuracy. However, as expressed previously by Robins and Ehrlich "In rapid examinations of large groups, the roll-paper method is the procedure of choice from the point of view of convenience, accuracy and economy." In my many years of intensive experience with the paper film medium, I have become adjusted to its use and am convinced it is optimum for the purpose.

The cost of the x-ray examination is important. Moreover, in governmental and public health agencies we are concerned with basic costs which should be all inclusive and not be written off in part under another heading. Edwards and Ehrlich include a detailed total and unit cost analysis of personnel, equipment, and material in which the unit cost for examining each person completely by roentgenogram was \$1.47. The cost of taking a roentgenogram and its interpretation without any further follow-up study was 58.8 per cent of the total or 0.867 cents per individual.

The unit cost to reject a man for military service on the basis of the total cost was \$106.02 for inductees and \$122.37 for Guardsmen, on the basis of a single roentgenogram and its interpretation \$63.93 for inductees and \$70.93 for Guardsmen.

Organization News

PRESIDENT OF COLLEGE GUEST SPEAKER IN INDIANA

Dr. Benjamin Goldberg, Chicago, Illinois, President of the American College of Chest Physicians, addressed the County and State Tuberculosis Committees of the Indiana State Medical Society, meeting in annual session at Indianapolis on September 24th. Dr. Goldberg spoke on "The Accomplishments of Organized Medicine in the Battle against Tuberculosis." Dr. Jas. H. Stygall, Indianapolis, Governor of the College for Indiana, and Chairman of the Tuberculosis Committee for the Indiana State Medical Society introduced Dr. Goldberg.

NEW BOOKS RECEIVED

Receipt of the following new books are acknowledged in this column. They will be reviewed in the future issues of this Journal.

Body Mechanics, by Joel E. Goldthwait, M.D., LL.D., and Staff; 3rd Edition, July 23, 1941. J. B. Lippincott Company, Philadelphia. Price \$5.00.

Artificial Pneumothorax, by Drs. Packard, Hayes and Blanchet. Lea & Febiger, Philadelphia. Price \$4.00.

Electrocardiography in Practice, by Ashton Grabel, M.D., Instructor in Medicine, Courses for Graduates, Harvard Medical School. Paul D. White, M.D., Lecturer in Medicine, Harvard Medical School. W. B. Saunders Company, Philadelphia and London, 1941. Pages 319; Illustrations 272.